LOW COST AUTOMATED MODULE ASSEMBLY FOR 180 GHz DEVICES, Phase I

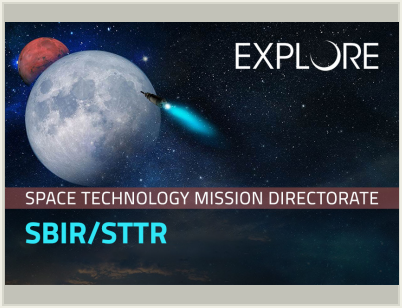
Completed Technology Project (2009 - 2009)

Project Introduction

Emergence of Indium Phosphide IC's has made possible devices operating at frequencies up to 200GHZ and beyond. Building modules using these devices opens a goldmine of military and commercial applications. Systems integration of these devices into affordable and reliable modules has been a challenge due to costs associated with assembly requirements. Research into: placement precision requirements, material selection and cost, assembly processes, and automation are the subjects of this proposal. Because of its capabilities, NxGen Electronics is uniquely qualified to perform this research. Since 2003 JPL has been developing Miniature MMIC low power Radiometers for GeoSTAR and PATH Missions. Current weather and surface observational satellites employ both infrared (IR) and microwave (MW) atmospheric sounders. Since clouds are almost completely opaque at infrared wavelengths, sounds require cloud free observation. POES satellites provide coverage but provide coverage in relatively narrow swaths, and with revisit time of 12-24 hours. GeoSTAR offers the possibility of MW temperature and water vapor soundings as well as rain mapping from GEO. The results of this SBIR research will be a direct benefit to these programs by using their requirements as a focus for the study, and provide the groundwork for broader support for the commercialization process.

Anticipated Benefits

Potential NASA Commercial Applications: Non NASA applications for low cost MIMIC devices operating at frequencies above 60GHz are enormous. Traditionally microwave designers have used discrete devices at great expense and size penalties limiting their applicability. The emergence of Indium Phosphide heterojunction bipolar transistors (HBT's) has now made it possible to offer 60-100GHz system solutions at lower cost with unprecedented performance advantages. Missile Radar (smaller antennas), Telecommunications (competing with cable), and Collision Avoidance systems are but a few of the applications where operation at these high frequencies in a compact and low cost implementation would benefit. Two major obstacles needed to be overcome are cost of assemblies in large volume and substrate costs. NxGen Electronics believes that full implementation of the proposed SBIR would greatly enhance its abilities to compete for some of these applications.



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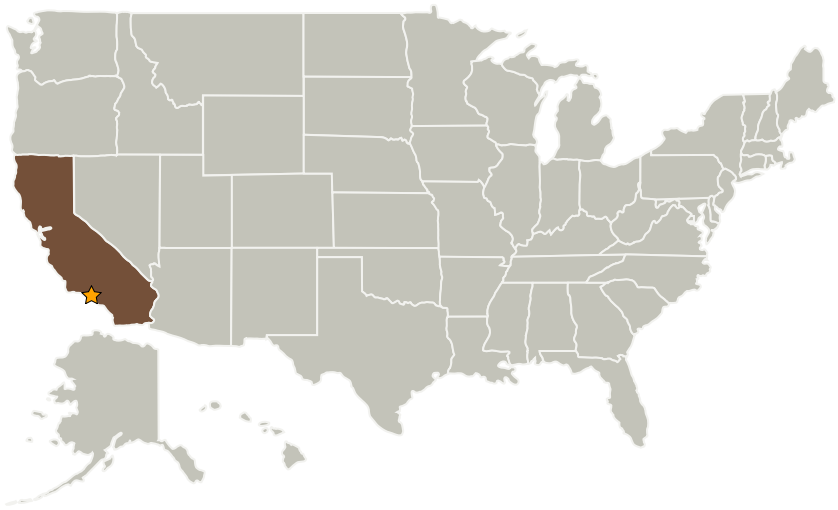
Primary U.S. Work Locations and Key Partners



Organizations Performing Work	Role	Type	Location
★Jet Propulsion Laboratory(JPL)	Lead Organization	NASA Center	Pasadena, California
NxGen Electronics, Inc.	Supporting Organization	Industry	San Diego, California

Primary U.S. Work Locations
California

Project Transitions

January 2009: Project Start

July 2009: Closed out

Closeout Summary: LOW COST AUTOMATED MODULE ASSEMBLY FOR 180 GHz DEVICES, Phase I Project Image

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Jet Propulsion Laboratory (JPL)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Project Manager:

Celestino Jun Rosca

Principal Investigators:

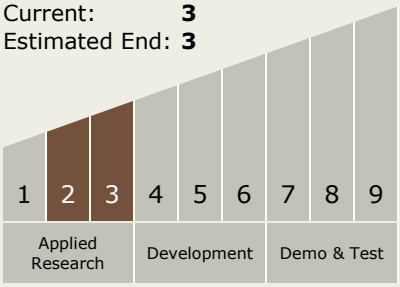
Donald Hashigawa
Donald Hayashigawa

LOW COST AUTOMATED MODULE ASSEMBLY FOR 180 GHz DEVICES, Phase I

Completed Technology Project (2009 - 2009)

Technology Maturity (TRL)

Start: **2**
Current: **3**
Estimated End: **3**



Technology Areas

Primary:

- TX08 Sensors and Instruments
  - TX08.1 Remote Sensing Instruments/Sensors
    - TX08.1.1 Detectors and Focal Planes